

We claim:

1           1.       A hardware database management system for managing and manipulating  
2 information stored in a database using standardized database statement, the hardware  
3 database management system comprising:  
4           a parser receiving the standardized database statements and converting the  
5 standardized database statements into executable instructions and data objects;  
6           an execution tree processor connected to the parse and receiving the executable  
7 instructions from the parser, the execution tree processor creating execution trees from  
8 the executable instructions and schedules the execution trees for execution; and  
9           a graph engine connected to the execution tree processor, the graph engine  
10 operable to manipulate the database as required by the executable instructions.

1           2.       The hardware database management system of Claim 1 wherein the  
2 information in the database is represented in memory in the form of graphs.

1           3.       The hardware database management system of Claim 1 wherein the  
2 execution tree processor is further operable to validate the executable instructions  
3 received from the parser.

1           4.       The hardware database management system of Claim 1 wherein the  
2 execution tree processor is further operable to ensure data integrity in the database and to  
3 control access to restricted information in the database.

1           5.       The hardware database management system of Claim 1 wherein the  
2 execution tree processor further comprises at least one function engine, the function  
3 engine operable to perform functions in accordance with the executable instructions.

1           6.     The hardware database management system of Claim 1 wherein the  
2     standardized database statements are Structured Query Language statements.

1           7.     The hardware database management system of Claim 1 wherein the  
2     execution tree processor is further operable to continually optimize the execution trees.

1           8.     The hardware database management system of Claim 1 wherein the  
2     manipulation of the database by the graph engine includes reading information from the  
3     database, writing information into the database and altering information in the database.

1           9.     The hardware database management system of Claim 1 wherein the  
2     execution tree processor may call routines from an external microprocessor.

1           10.     A data flow engine for implementing a database management system in  
2 hardware, the database management system operable to process standardized database  
3 statements against a database of information, the data flow processor comprising:  
4           a parsing engine operable to convert the standardized database statements into  
5 executable instructions; and  
6           an execution engine receiving the executable instructions from the parsing engine,  
7 the execution engine validating the executable instructions, and building execution trees  
8 to schedule the executable instructions, the execution engine further operable to ensure  
9 the integrity of the information in the database and to control access to restricted  
10 information in the database; and  
11           a graph engine operable to execute the executable instructions that require the  
12 manipulation of the information in the database.

1           11.     The hardware database management system of Claim 10 wherein the  
2 information in the database is stored in random access memory accessible to the graph  
3 engine.

1           12.     The hardware database management system of Claim 10 wherein the  
2 database is represented in memory attached to multiple data flow engines, and wherein  
3 the data flow engine may access information by sending requests to a second data flow  
4 engine.

1           13.     The hardware database management system of Claim 10 wherein the  
2 execution tree processor further comprises at least one function engine, the function  
3 engine operable to perform functions in accordance with the executable instructions.

1           14.     The hardware database management system of Claim 10 wherein the  
2     standardized database statements are Structured Query Language statements.

1           15.     The hardware database management system of Claim 10 wherein the  
2     standardized database statements are Xtensible Markup Language.

1           16.     The hardware database management system of Claim 10 wherein the  
2     execution tree processor is further operable to continually optimize the execution trees.

1           17.     The hardware database management system of Claim 10 wherein the  
2     manipulation of the database by the graph engine includes reading information from the  
3     database, writing information into the database and altering information in the database.

1           18.     The hardware database management system of Claim 10 wherein the  
2     execution tree processor may call routines from an external microprocessor.